

## BLOCK READER MEMORY MODULE

The Digitronics Block Reader Memory Module (BRMM) is a compact, reliable, all solid state device, capable of storing 20 character blocks of information with 8 bits per character. The BRMM is basically a flip flop memory into which individual characters are distributed under control of a built-in counter and appropriate gating.

Fundamentally, the BRMM is designed to operate with a Digitronics perforated tape reader as an input. However, so long as the appropriate logical and signal conditions are met on the input, any type of unit can be used. The maximum input repetition rate is 50 usec/char. Internal logic also permits the use of mechanical contact closures besides purely electronic inputs, even though contact bounce occurs. When used with a Digitronics photoelectric tape reader, the operational sequence for a block reader system would be as follows:

### Operational Sequence Description —

- 1) A Start/Clear Command is sent to the block reader from the external equipment.
- 2) Upon receipt of the external START/CLEAR Command, the memory module will clear the memory and generate a REQUEST FOR INFORMATION signal which will start the tape reader feeding data into the memory.
- 3) The reader will then feed in on a character by character basis. The characters are presented 8 bits at a time in parallel to the block reader module. The sprocket signal is used for strobing the character into the memory. In addition, the sprocket signal advances a counter one step each time it occurs. The counter, in turn, acts as a distributor by determining into which set of flip flops the particular character is to be stored.
- 4) Upon reading a STOP CHARACTER (a specific code combination predetermined by the customer); or when a predetermined "CHARACTER COUNT" is reached; or when an external "STOP" is received from the external equipment; the block reader will remove the "REQUEST FOR INFORMATION" signal. This will stop the tape reader and the cycle.

- 5) At this point, all the information is stored in memory. This STOP signal will generate a READY signal for the external equipment that can be used to indicate either that the memory is full and can be read out or that the memory is cycling. The block of information will remain in storage until the next REQUEST FOR INFORMATION signal is generated.

It should be noted that variable lengths are permitted. When the block length is less than maximum, and the STOP CHARACTER code option used; the STOP CHARACTER will be stored in the memory and all remaining unused positions in memory will stay at logical "0" (+15 volts). However, if maximum storage is to be used, the STOP CHARACTER will not be stored in memory. The BRMM can then store up to the maximum of 20 Information Characters.

Mating connectors are supplied with the unit. The physical layout is such that each 8 bit memory module (1 character) has a printed circuit connector at both ends. One end plugs into the main frame chassis. The other end of the module comes supplied with a printed circuit connector to which the customer wires, to receive the output signal.

The memory outputs are NPN enclosures to ground with a maximum external load of 75ma. It can be used as a logical indication or for operating relays directly. The external load can be connected to ground under conditions noted in the specifications.

The power supply in the module supplies only the current necessary for controls and for switching. The customer's external power supply must supply the power required for driving the external loads, such as relay coils.

The AC power requirements are 115V  $\pm$  10V, 60 cps. lamp RMS, single phase power.

The dimensions of the block reader is 19"W x 7" H x 12 1/2"D. Will accept #10 screws spaced to fit RETMA racks.



## INTERFACE SIGNALS

### CONTROLS INTO BRMM FROM EXTERNAL EQUIPMENT

#### 1) External START/CLEAR Control

The BRMM will start when a +6V at 2ma pulse of 20 usec minimum duration is applied to the input. The tolerance on the +6V Start signal is from +5V to +30V. Its non-operating level is 0V  $\pm$  0.5V at 0.5ma. This START/CLEAR Signal will generate a REQUEST FOR INFORMATION signal.

The START command time of 20 usec includes the inhibit time necessary to clear the memory.

#### 2) External STOP Control

The BRMM will stop from an external source when a +6V at 2ma pulse of 6 usec duration is applied to the STOP Control input. The tolerance on the +6V is +5V to +30V. Its non-operating level is 0V  $\pm$  0.5V at 0.5ma. The stop input will not clear the memory. The memory output will be available as long as the BRMM is in a STOP CONDITION.

### CONTROL FROM BRMM TO TAPE READER

#### "REQUEST FOR INFORMATION" Signal

The BRMM can generate either a +6V  $\pm$  0.5V @ 4ma/0V  $\pm$  0.5V @ 8.0ma or a -6V  $\pm$  0.5V @ 6ma/0V  $\pm$  0.5V @ 8.0ma REQUEST FOR INFORMATION signal. The REQUEST FOR INFORMATION signal of the BRMM is connected to the RUN input of the tape reader

The REQUEST FOR INFORMATION signal is at 0 volts during all of the following conditions:

- 1) Before a START command has been received from the external equipment at initial turn on.
- 2) After a STOP CHARACTER code has been read.
- 3) Upon completion of a CHARACTER COUNT STOP.
- 4) Upon receipt of an external STOP command.

#### Data and Sprocket Inputs from Reader to BRMM

The BRMM will operate with any positive input reader (+10V hole, 0V no hole).

#### 1) Data Channels

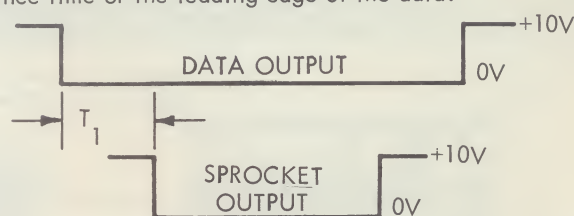
Hole +10V at 5ma. The voltage operating range is from +5V to +16V. No hole operating range is from 0V  $\pm$  0.5V at 5ma. The minimum duration of the data input is 30 usec.

#### 2) Sprocket Channels

Hole +10V at 5ma. The voltage operating range is from +5V to +16V. No hole operating range is from 0V  $\pm$  0.5V at 3ma. The sprocket input must be delayed a minimum of 10 usec from the data input. The minimum duration of a sprocket input is 6 usec. Note: the sprocket input must turn off a minimum of 5 usec before the data channels turn off.

#### 3) Mechanical Input - See Fig. 1

When using data output from a mechanical reader, the minimum time of  $T_1$  must be greater than the contact bounce time of the leading edge of the data.



DATA OUTPUT VS SPROCKET OUTPUT  
FOR ELECTRONIC & MECHANICAL READERS

### OUTPUT OF BRMM TO EXTERNAL EQUIPMENT

#### 1) Ready Line:

The Ready line is used to indicate that a complete block of information is in memory or that the BRMM is in the process of filling up memory. When the Ready Line is at 0V  $\pm$  0.5V @ 8ma a complete block of information is in memory and is available as read out until the next REQUEST FOR INFORMATION Signal is generated. When the Ready Line is at +6V  $\pm$  0.5V @ 6ma the BRMM is in the process of storing data.

#### 2) Data Lines:

1) Hole Condition: 0V  $\pm$  1.5V / -0V Maximum external load is 75ma.

#### No Hole Condition - With External Load Attached to +14V Power Supply

Output: +13.5V  $\pm$  2.5V / -0V = With external load

+11.5V  $\pm$  2.5V / -0V = No external load

With the external power supply at +14V  $\pm$  2V / -0V it can be used to operate relays. Note for Relay Operation: A diode must be placed in parallel with relay coil to reduce the transients.

### OPTIONS AND FEATURES OF THE BRMM

The following features are available in the unit:

1. The number of characters that can be handled can vary from 2 to 20. Additional characters can be added at a later time.
2. The system can be wired to stop on either a STOP CHARACTER CODE or to count a specific number of characters.
3. A NO DATA INHIBIT feature will either ignore or read, dependent upon wiring, a character containing no information holes.
4. Special circuitry is available that will enable the unit to accept a Bi-directional Tape Reader. This feature is available as an option.

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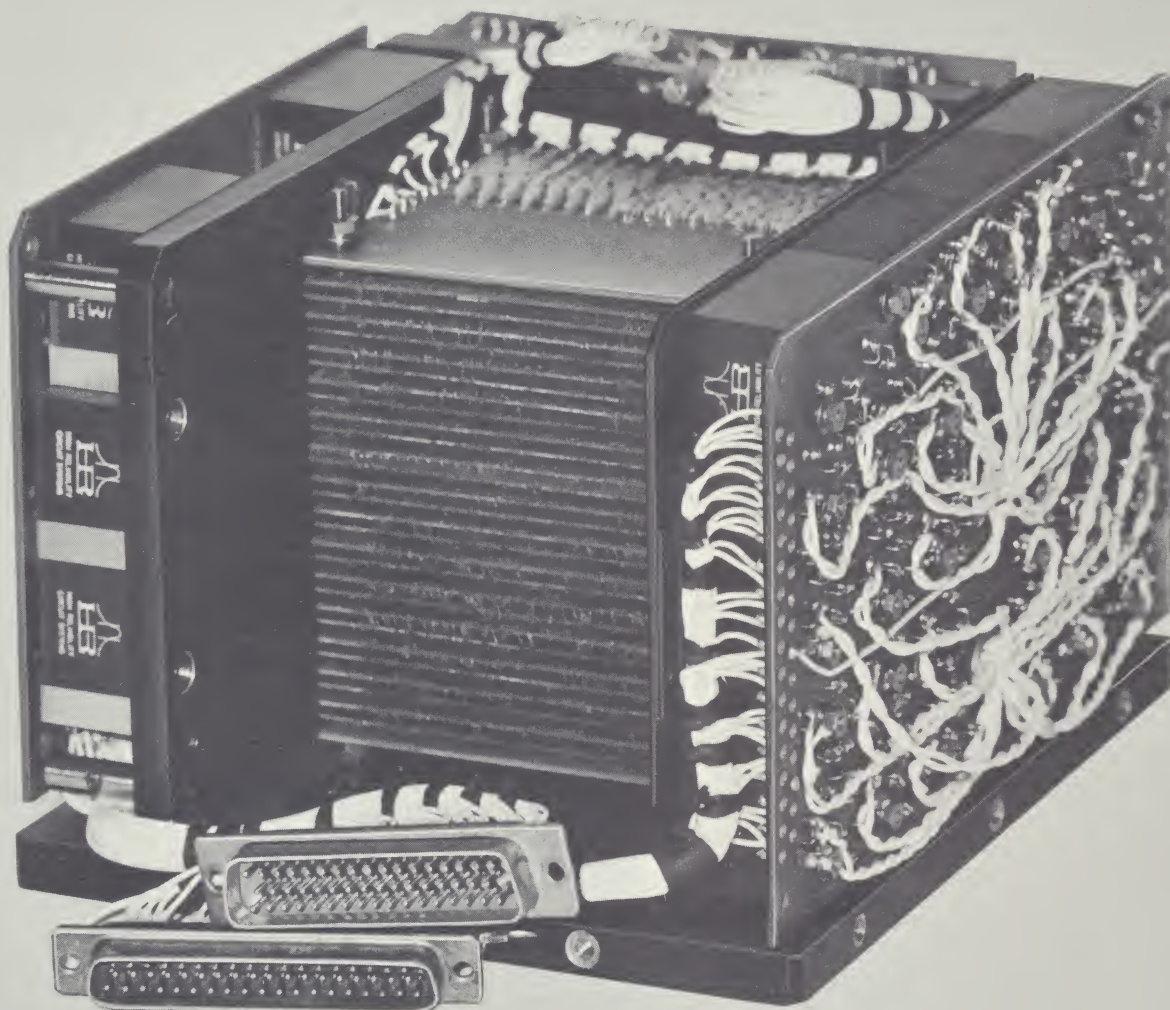
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MARCH, 1965



### **SEMS-3R AEROSPACE CORE MEMORY SYSTEM**

<b>Capacity:</b>	256 to 4096 words / 4 to 28 bits per word
<b>Speed:</b>	4.5 $\mu$ sec cycle time
<b>Temperature Range:</b>	-55°C to +100°C or -25°C to +75°C
<b>Size:</b>	4½" x 5¾" x 6¾"
<b>Volume:</b>	175 cubic inches

Meets MIL shock, vibration and humidity specifications

**electronic memories inc.**

12621 Chadron Avenue, Hawthorne, California



## THE SEMS-3R

Volume: 175 cubic inches.

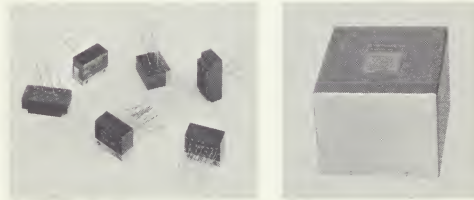
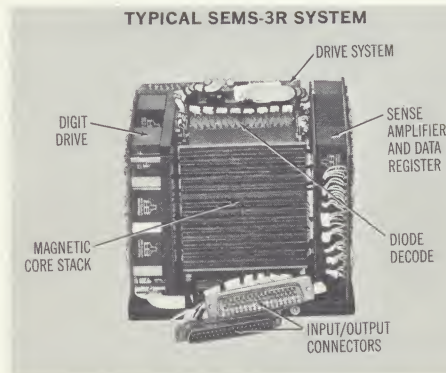
Capacity: 4096 words of 28 bits.

Speed: Access time less than 1.0 micro-seconds; 220,000 Random Memory cycles per second. Cycle time less than 4.5 microseconds.

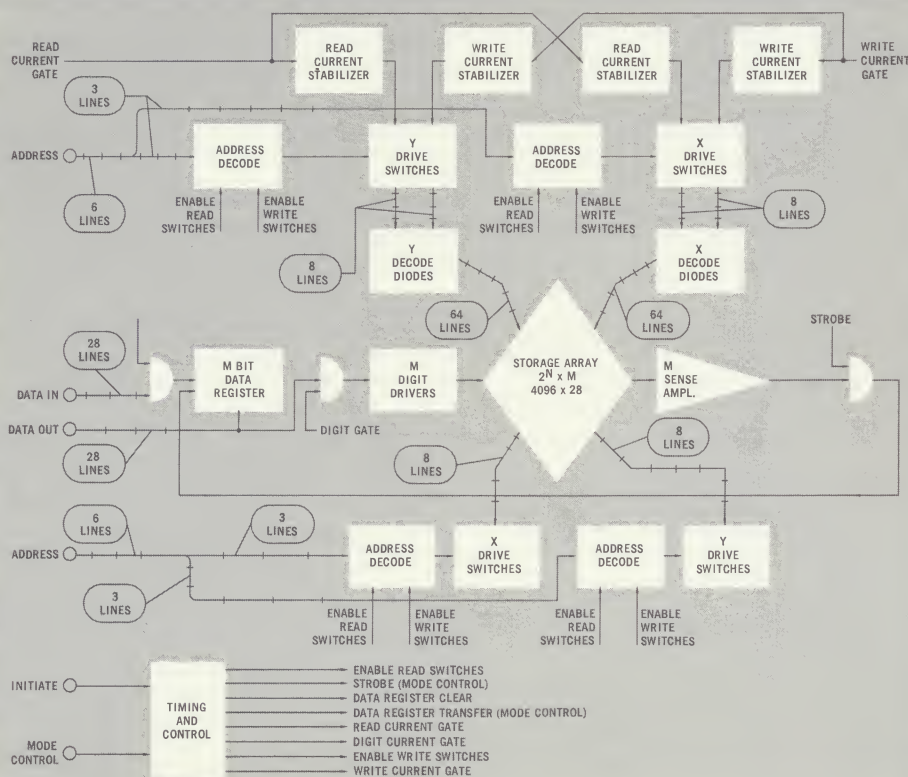
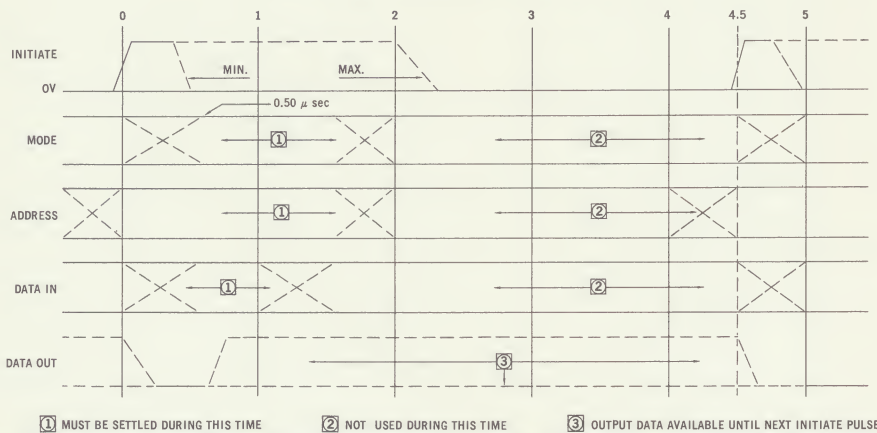
Environments: MIL-E-5400, MIL 16400E, MIL 4158B.

The SEMS-3R allows severe environment control and guidance systems designers to put a fast, rugged, large capacity core memory system into tightly restricted space. The memory system is available in a range of word capacities and bit sizes. The SEMS-3R is available in two operating temperature range versions for maximum applications economy.

The SEMS-3R is designed specifically for airborne, satellite, shipboard and ground based applications where high reliability, low weight and volume, minimum power and high speed are required design criteria.



### TIME IN MICROSECONDS



## SPECIFICATIONS

<b>Storage Capacity</b>	256, 512, 1024, 2048, or 4096 words by 4 to 28 bits (in 2 bit increments)
<b>Operating Temperature</b>	-55°C to +100°C or -25°C to +75°C
<b>Storage Temperature</b>	-65°C to +125°C
<b>Altitude</b>	70,000 ft., or higher at slightly reduced upper temperature limits
<b>Read/Restore Cycle Time</b>	4.5 μsec.
<b>Clear/Write Cycle Time</b>	4.5 μsec.
<b>Access Time</b>	Less than 1.0 μsec.
<b>Operating Rate</b>	0 to 220 Kc
<b>Input Signal Levels</b>	Binary 0 = 0 to 0.5 V Binary 1 = +4 V to +7 V
<b>Output Signal Levels</b>	Binary 0 = 0 to 0.25 V Binary 1 = +5 V to +6.5 V

### Input Currents

- A. Address: 3 ma. max. for 1.5 μsec. if line is in + state; 0 ma. if line in 0 state
- B. Mode Control: 0.4 ma. in 0 state (CLEAR/WRITE), 0 ma. when in + state (READ/RESTORE)
- C. Information: 0 level — no current required ± level — less than 1.0 ma.
- D. Initiate: 0 level — no current required + level — less than 1.0 ma.
- E. Edge Current: In addition to the logic current required, approximately 9.0 ma. of edge current must be supplied to charge a capacity of approximately 200 μμf to effect a change from one logic level to another level within 100 nanoseconds

### Output Current

- Information Lines: 0 level — 0 current  
+ level — 5.0 ma.

<b>Input Signal Characteristics</b>	Rise Time (μsec.)	Width (μsec.)
A. Address	.1	1.5 min.
B. Initiate	.1	0.2 to 2.0
C. Information Lines	.1	1.0 min.
D. Mode Control	level	level

<b>Output Signal Characteristics</b>	Information
	.1      2.0 min.

**Power Req't** (4096 x 28) 35 watts for 4.5 μsec. cycle time

**Voltages Required** +15, +6, -3

**Volume** (4096 x 28) 175 cubic inches

**Weight** (4096 x 28) 8 lbs.

**Form Factor** (4096 x 28) Length = 6.75; Width = 5.79; Height = 4.45

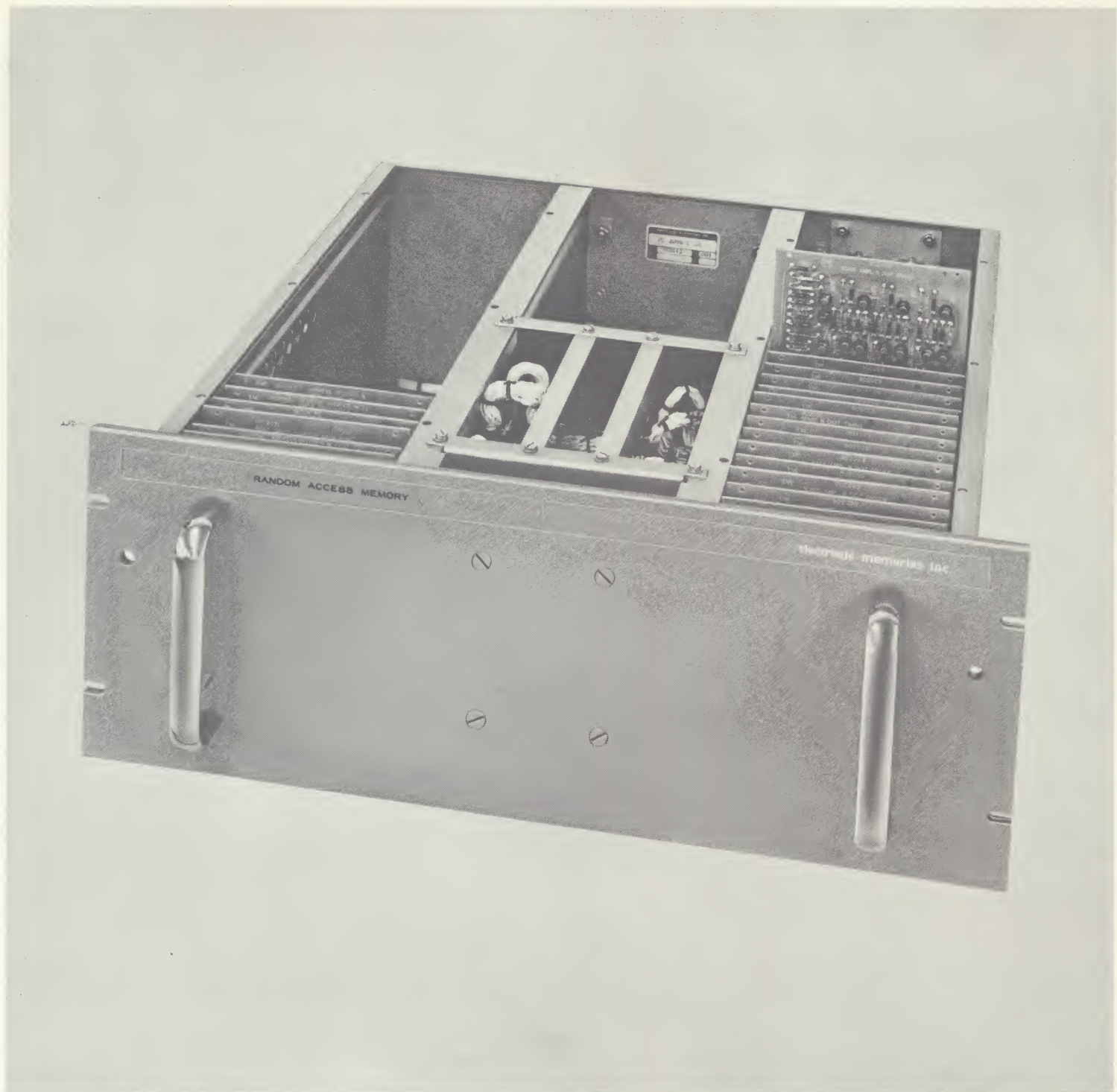
**Applicable Mil Specs** MIL-E-5400, MIL 16400E, MIL 4158B, MIL-Q-9858

**Vibration and Shock** Per applicable mil spec

**Type of Packaging** Welded circuit modules and encapsulated magnetics

Word capacities to 8192 and bit length to 56 are available for special requirements.





### **SEMS-4R CORE MEMORY SYSTEM**

**Capacity:** 256 to 8192 words  
6 to 40 bits per word

**Speed:** 4  $\mu$ sec cycle time, 1  $\mu$ sec access time

**Operating Temperature Ranges:**  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$   
 $-20^{\circ}\text{C}$  to  $+65^{\circ}\text{C}$   
 $0^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$

**Size:** 17" x 17" x 7" (19" rack mounting)

**Volume:** 2023 cubic inches

Meets MIL shock, vibration and humidity specifications

**electronic memories inc.**

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